

Switch Amplifier, Timer Relay

KFU8-SR-1.3L.V

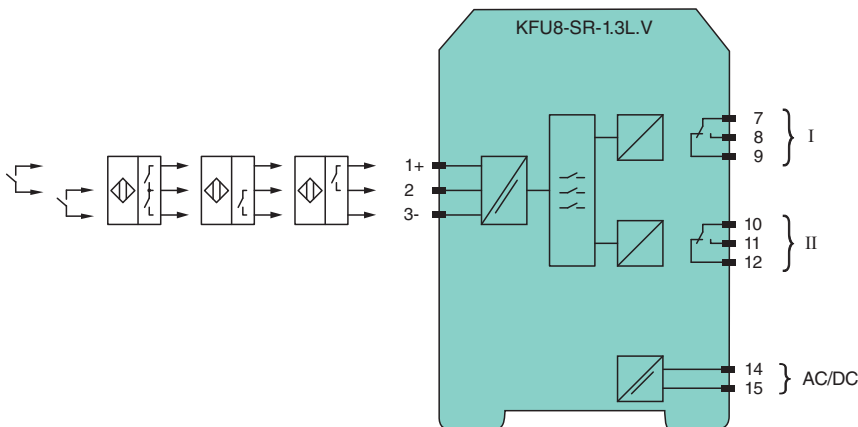
- 1-channel signal conditioner
- Universal usage at different power supplies
- 3-wire PNP/NPN sensor or push-pull input
- 2 relay contact outputs
- Adjustable energized/de-energized delay
- Up to SIL 2 (SC 3) acc. to IEC/EN 61508



Function

This signal conditioner converts the state of 3-wire sensors (PNP or NPN) or sensors with push-pull output stages into two relay outputs. It has one input and two form C changeover relay outputs. The switch amplifier has an adjustable energized/de-energized delay for the relay outputs. The start-up time of the device is as long as the time setting value + 500 ms.

Connection



Technical Data

General specifications	
Signal type	Digital Input
Functional safety related parameters	
Safety Integrity Level (SIL)	SIL 2
Systematic capability (SC)	SC 3
Supply	
Connection	terminals 14, 15
Rated voltage	U_r 20 ... 48 V DC or 90 ... 253 V AC , 45 ... 65 Hz
Rated current	I_r ≤ 230 mA
Power dissipation	2.3 W
Power consumption	max. 4.5 W
Input	

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Refer to "General Notes Relating to Pepperl+Fuchs Product Information".

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Technical Data

Connection side		field side
Connection		terminals 1+, 2, 3-
Rated values		22 ... 24 V DC / 100 mA , see additional information
Short-circuit current		max. 125 mA
Switching point		PNP: 0-signal: < 12.5 V 1-signal: > 13.5 V NPN and push-pull output: 0-signal: < 4.5 V 1-signal: > 5.5 V
Output		
Connection side		control side
Connection		output I: terminals 7, 8, 9 output II: terminals 10, 11, 12
Output I, II		signal, relay
Contact loading		250 V AC / 2 A / $\cos \phi \geq 0.7$; 125 V AC/4 A/ $\cos \phi > 0.7$; 40 V DC / 2 A
Mechanical life		20 x 10 ⁶ switching cycles
Electrical life		0.2 x 10 ⁶ switching cycles (40 V DC, 2 A, ohmic) 0.4 x 10 ⁶ switching cycles (253 V AC, 2 A, $\cos \phi = 1$) 0.25 x 10 ⁶ switching cycles (253 V AC, 2 A, $\cos \phi = 0.7$)
Minimum load		50 mW, 5 V DC
Energized/De-energized delay		≤ 90 ms / ≤ 90 ms
Transfer characteristics		
Switching frequency		≤ 5 Hz for delay 0 s adjustable energized/de-energized delay: 0 ... 79 s
Galvanic isolation		
Input/Output		reinforced insulation according to IEC/EN 61010-1, rated insulation voltage 300 V _{eff}
Input/power supply		reinforced insulation according to IEC/EN 61010-1, rated insulation voltage 300 V _{eff}
Output/power supply		reinforced insulation according to IEC/EN 61010-1, rated insulation voltage 300 V _{eff}
Output/Output		reinforced insulation according to IEC/EN 61010-1, rated insulation voltage 300 V _{eff}
Indicators/settings		
Display elements		LEDs
Control elements		DIP switch
Configuration		via DIP switches
Labeling		space for labeling at the front
Directive conformity		
Electromagnetic compatibility		
Directive 2014/30/EU		EN 61326-1:2013 (industrial locations)
Low voltage		
Directive 2014/35/EU		EN 61010-1:2010
Conformity		
Electromagnetic compatibility		NE 21:2012
Degree of protection		IEC 60529:2001
Ambient conditions		
Ambient temperature		-20 ... 60 °C (-4 ... 140 °F)
Mechanical specifications		
Degree of protection		IP20
Connection		screw terminals
Mass		approx. 166 g
Dimensions		20 x 119 x 115 mm (0.8 x 4.7 x 4.5 inch) (W x H x D) , housing type B2
Mounting		on 35 mm DIN mounting rail acc. to EN 60715:2001
Data for application in connection with hazardous areas		
Supply		48 V DC
Certificate		PF 10 CERT 1417 X
Marking		⊕ II 3G Ex nA nC IIC T4 Gc
Output I, II		

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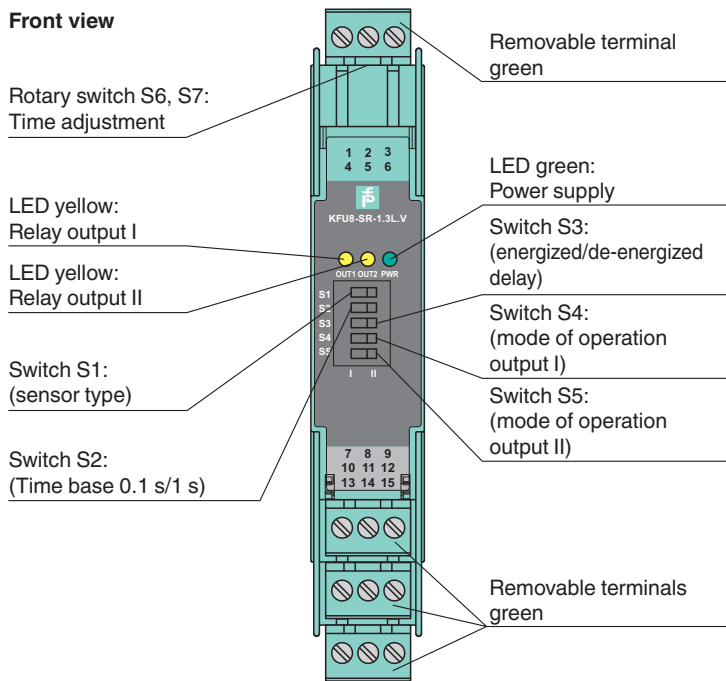
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Technical Data

Contact loading	50 V AC/2 A/cos φ > 0.7; 40 V DC/1 A resistive load
Directive conformity	
Directive 2014/34/EU	EN 60079-0:2012+A11:2013 , EN 60079-15:2010
General information	
Supplementary information	Observe the certificates, declarations of conformity, instruction manuals, and manuals where applicable. For information see www.pepperl-fuchs.com .

Assembly

Front view



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Additional Information

Function

The single-channel switch amplifier has one input and two relay outputs (change-over contacts). The input circuit can process signals from sensors that have either PNP/NPN output transistors or push-pull outputs. If sensors have NPN or push-pull outputs, switch S1 must be set to position I. If sensors have PNP output transistors, switch S1 must be set to position II.

The output switching characteristics (switch S4 for output I, switch S5 for output II) can be selected:

- Relay activated for closed sensor contact (for pull-push outputs, contact between terminals 2 and 3 closed) – switch S4 or S5 in position I.
- Relay deactivated for open sensor contact (for pull-push outputs, contact between terminals 2 and 3 open) – switch S4 or S5 in position II.

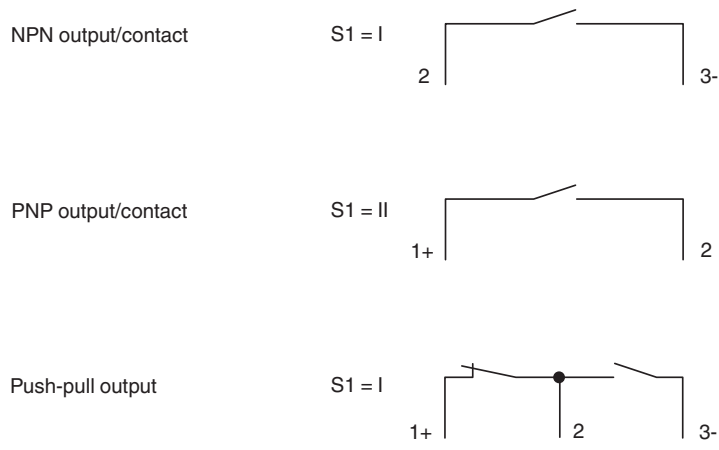
The switch amplifier has an adjustable energized/de-energized delay for the relay outputs.

Switch S3 = I activates the energized delay and switch S3 = II activates the de-energized delay. Depending on switch S2 (default time setting 0.1 s/1 s), the delay time can be set to between approx. 0.1 s and 7.9 s (for S2 = I) or between approx. 1 s and 79 s for (S2 = II) using switches S6 and S7.

The delay times add up to the shortest possible response times and have a tolerance of 10 %.

Switch S6 has a value range of 0 to 7, which is used to set the decimal power of the delay; switch S7 has a value range of 0 ... 9, which is used to set the single power of the delay. If the default time setting of S2 = I, S6 = 0 and S7 = 0, the response time constant of the switch amplifier for the undelayed slope (see switch position S3) is < 20 ms and for the delayed slope < 90 ms. These are the shortest possible response times.

Sensor connection



Characteristic curve

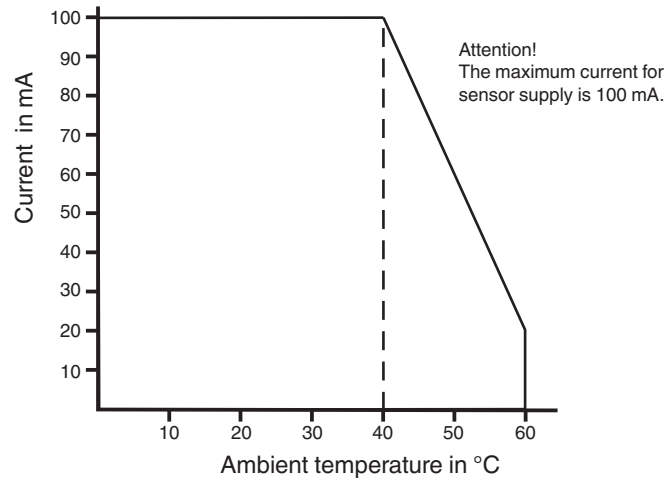
The sensor currents are derated in line with the ambient temperature

The maximum value of the sensor currents is controlled by a thermal overload protection on the device.



The device measures the ambient temperature and limits the sensor currents accordingly (see figure). An inadmissibly high ambient temperature can limit the function of the sensors.

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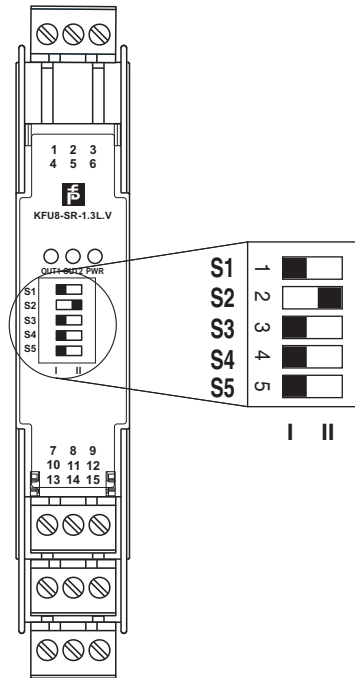
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Configuration

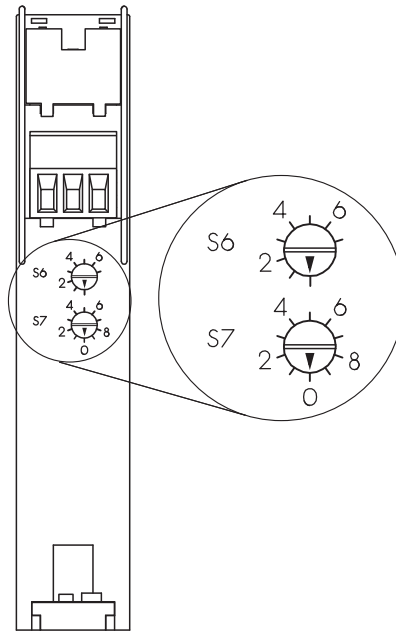
Function of the DIP switch



S	Function	Position	
1	Sensor type	Input: Push-pull output, NO contact, NPN	I
		Input: PNP, NO contact	II
2	Default time	Default time = 0.1 s x (time setting value of switches S6 and S7)	I
		Default time = 1 s x (time setting value of switches S6 and S7)	II
3	Operating mode	ON delay, minimum input pulse length	I
		OFF delay, minimum output pulse length	II
4	Direction detection	Output I activated if sensor closed	I
		Output I activated if sensor open	II
5	Direction detection	Output II activated if sensor closed	I
		Output II activated if sensor open	II

Default setting: switches 1, 3, 4 and 5 to position I and switch 2 to position II

Function of the rotary switch



S	Function		Position
6	Time setting	Decimal value 0 ... 7 x 10 x (default time setting value of switch S2)	0 ... 7
7	Time setting	Decimal value 0 ... 9 x (default time setting value of switch S2)	0 ... 9

Default setting: switches 6 and 7 to position 0